



# Get into Programming with JavaScript

Axle Barr

Data Structures - Arrays

# Efficiency and economies of scale



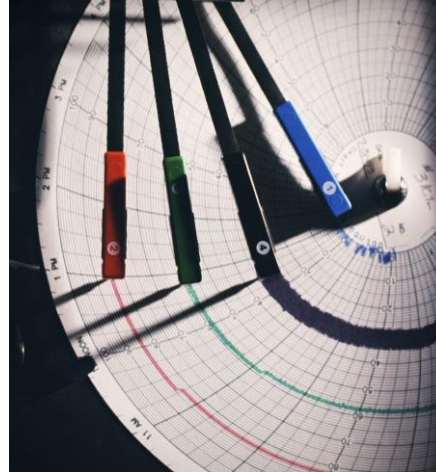
---

Instead of drawing  
one line, why not  
draw four, five or  
eight



---

Instead of cooking  
one burger why not  
cook 5 or 10



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Instead of measuring  
one seismic event,  
why not monitor  
several of them

**HANDLING  
MULTIPLE  
ITEMS AT  
ONCE**

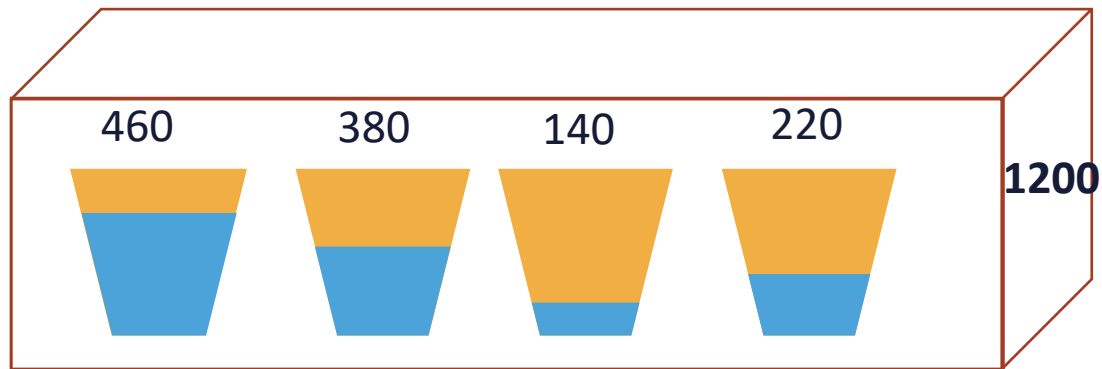
# THE HUMBLE VARIABLE ON STEROIDS

## Handling multiple values at once

- Variable store values
- As many as we want
- Different types, *str*, *int*, *bool*, *float*
- Limits
- An array is a collection of variables of the same type\*
- Array is very useful in programming
- Data structure

## Put buckets in a barrel

We can pour the water from one or more buckets into a barrel or we can find a suitable container and put the buckets in there

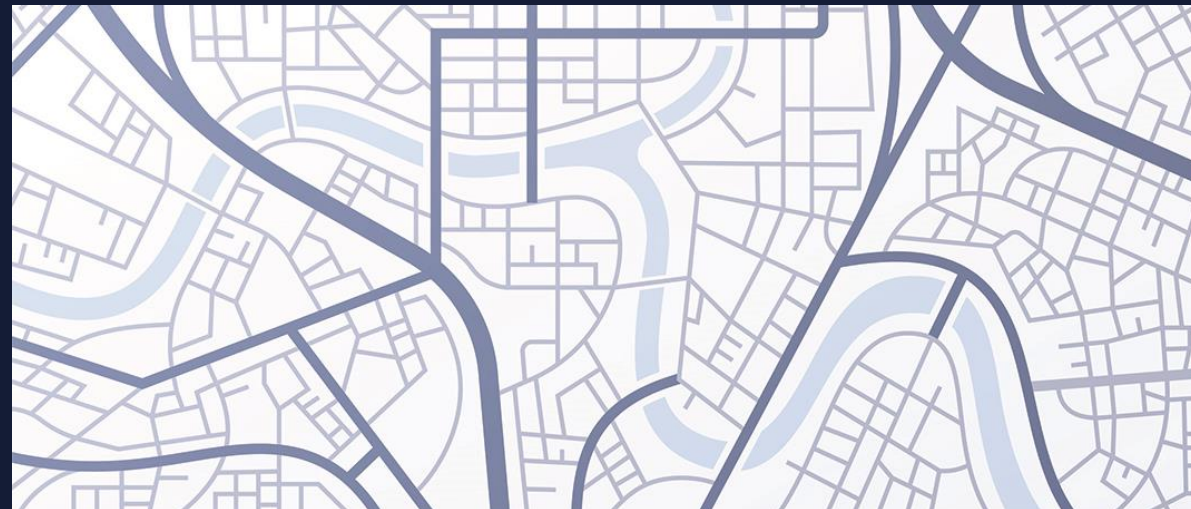
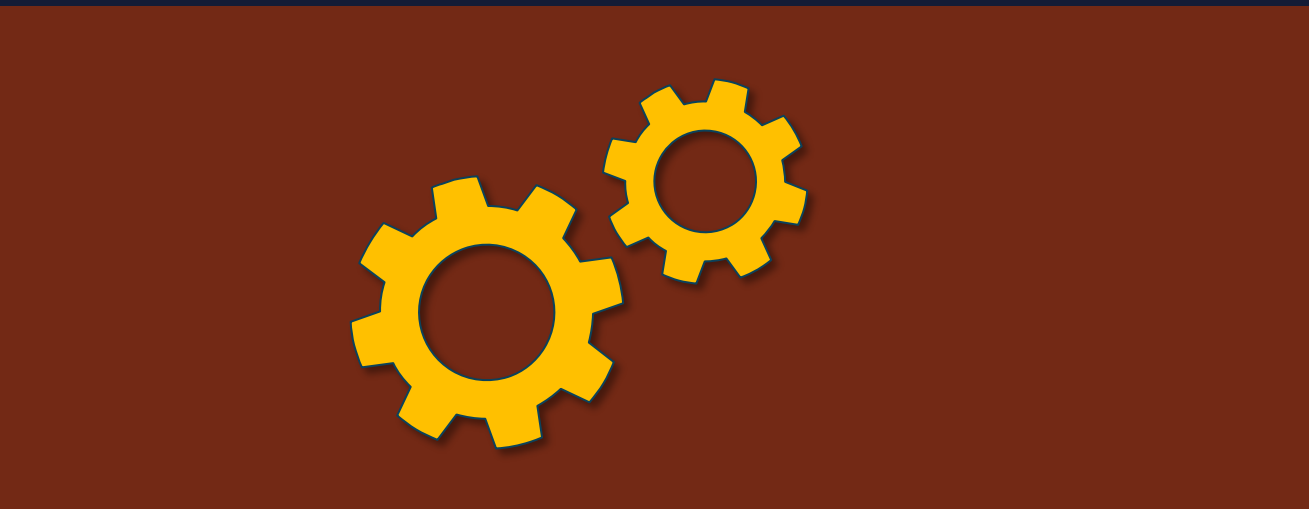


**CONTAINERIZED  
BUCKETS**

If we did the container option, then we can use the original buckets

# EXAMPLES OF ARRAYS

Graphics and OST Goes Here:





# WHICH MAILBOX BELONGS TO SAM

Or Sally or Jim or Axle

Mailboxes have numbers on them

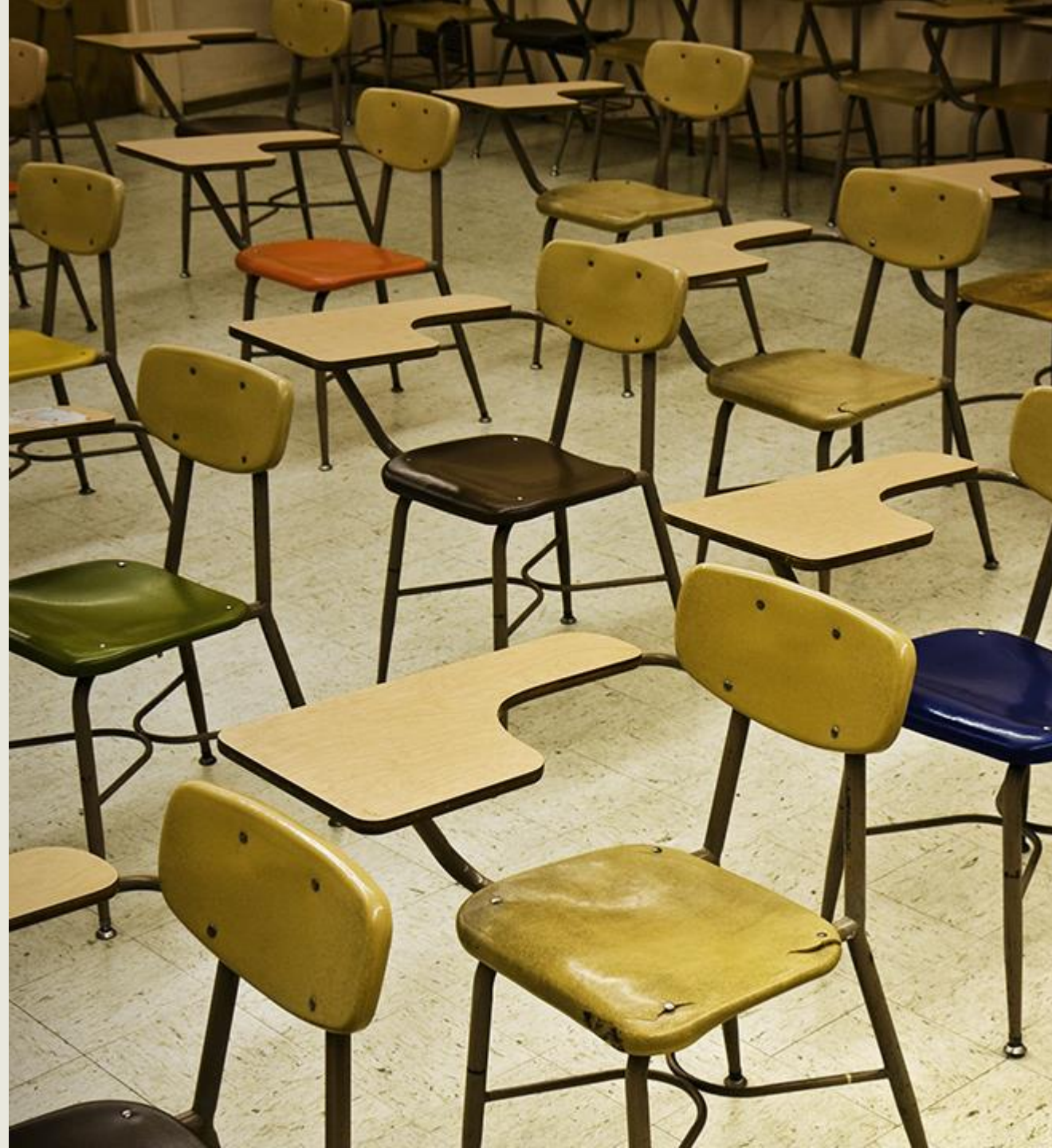


# WHERE DOES MARY SIT

**Or Anthony or Clara or Axle**

Each student can be identified by the row number and their seat in that row

We can say that Molly sits in the third row next the wall



# WHERE DOES GEORGE LIVE

**Or Collin or Chanelle or Axle**

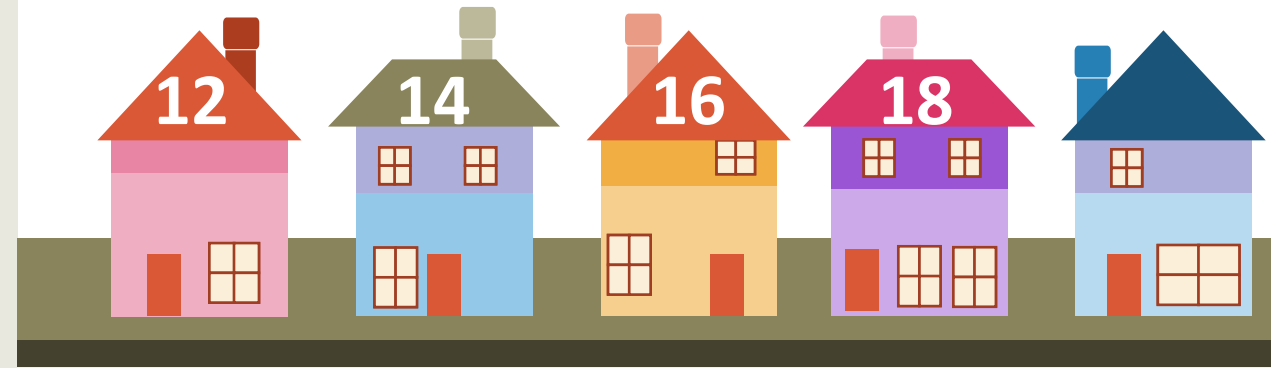
Houses on a street is more straight  
forward, we can say Lewis lives on 16  
Main Street. Steve lives on 14 main street





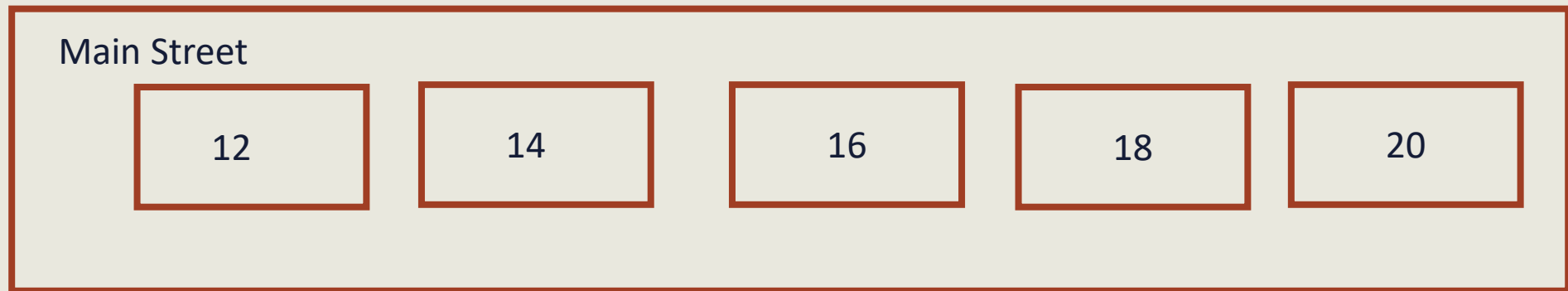
# IDENTIFY THE HOUSES

A typical street with houses on it



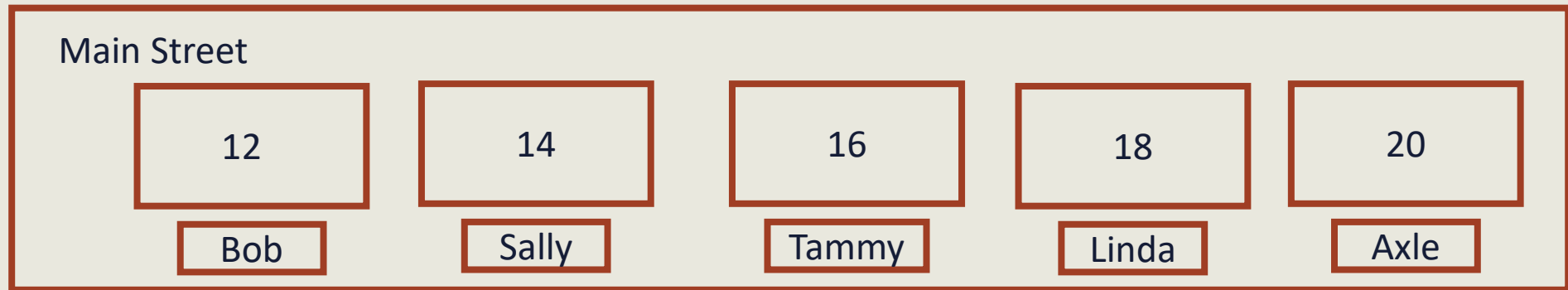
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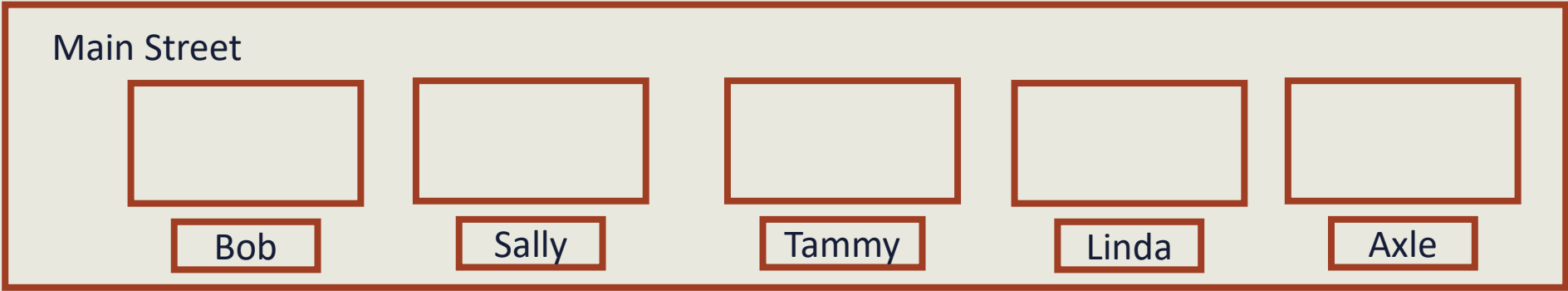
# IDENTIFY THE HOUSES

A typical street with houses on it



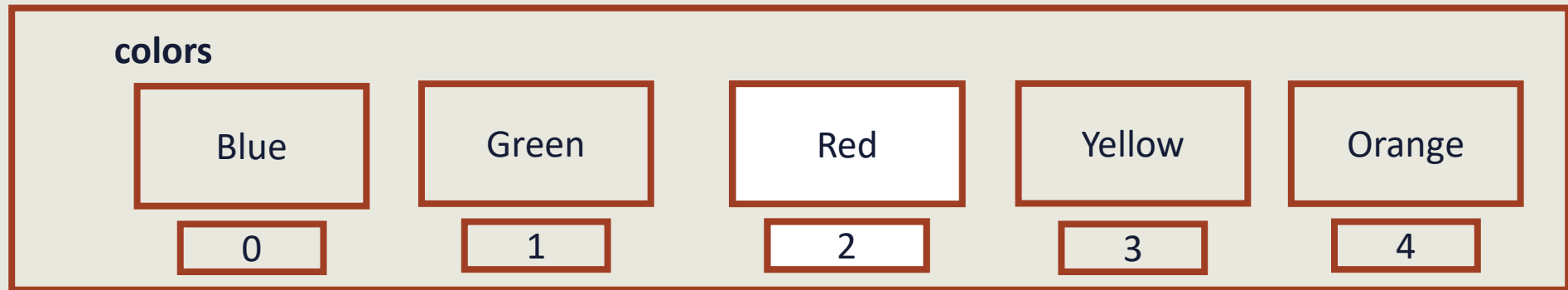
# IDENTIFY THE HOUSES

A typical street with houses on it

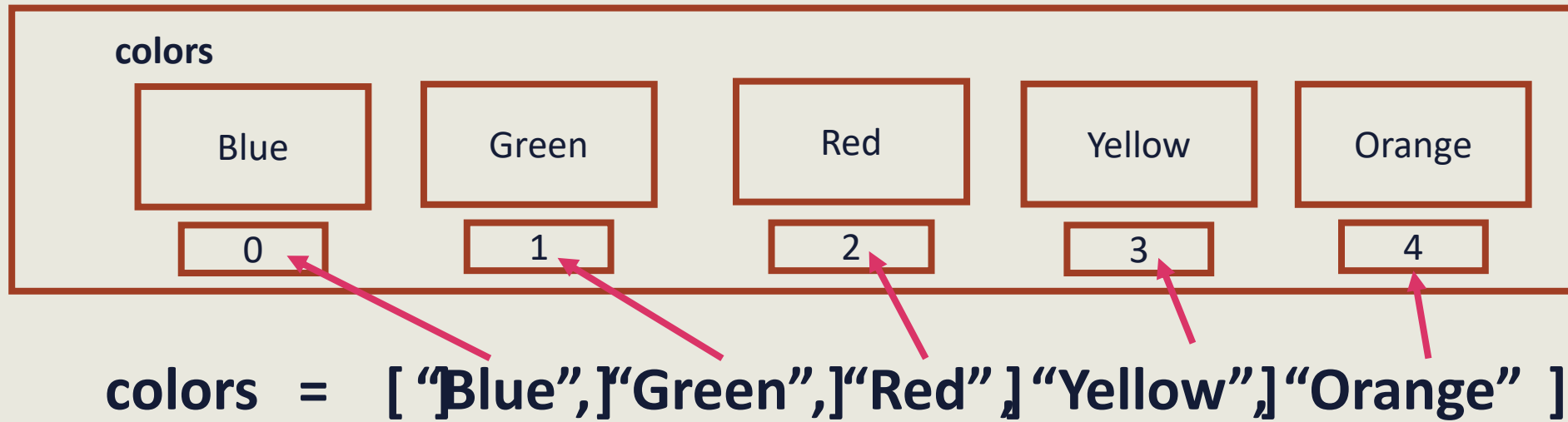




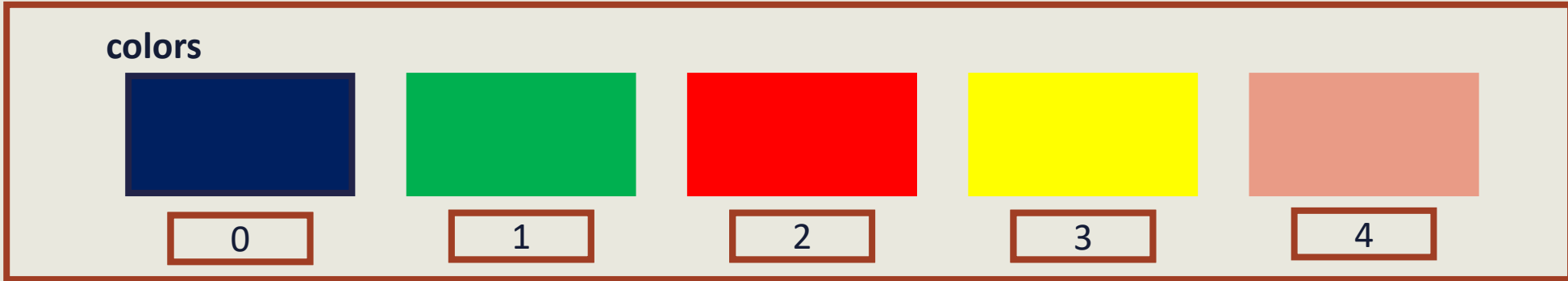
# AN ARRAY OF COLOURS



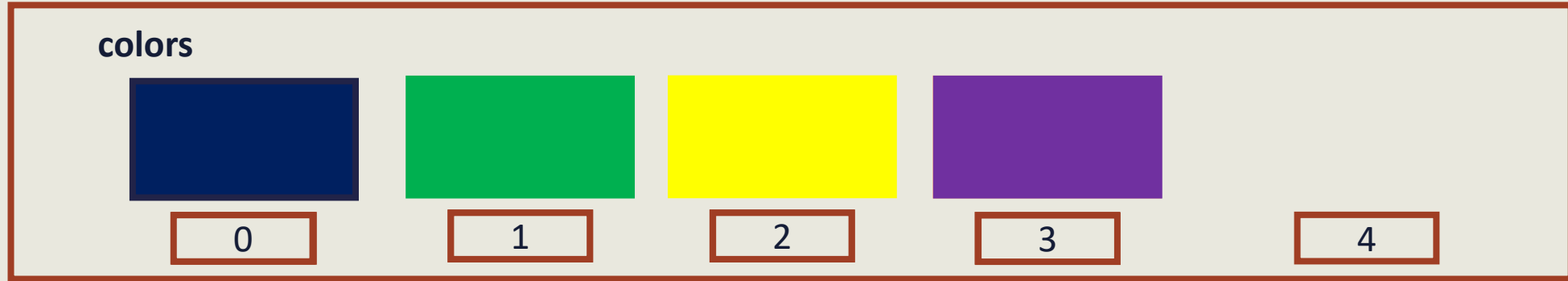
# AN ARRAY OF COLOURS



# AN ARRAY OF COLOURS

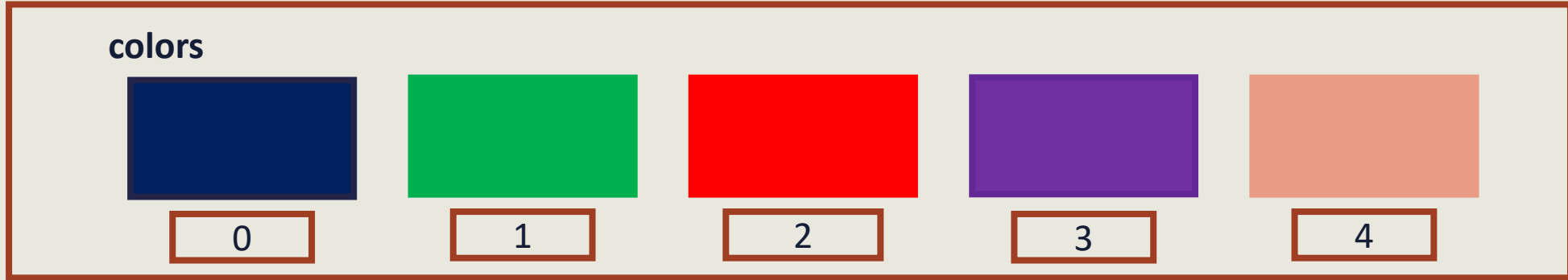


# AN ARRAY OF COLOURS



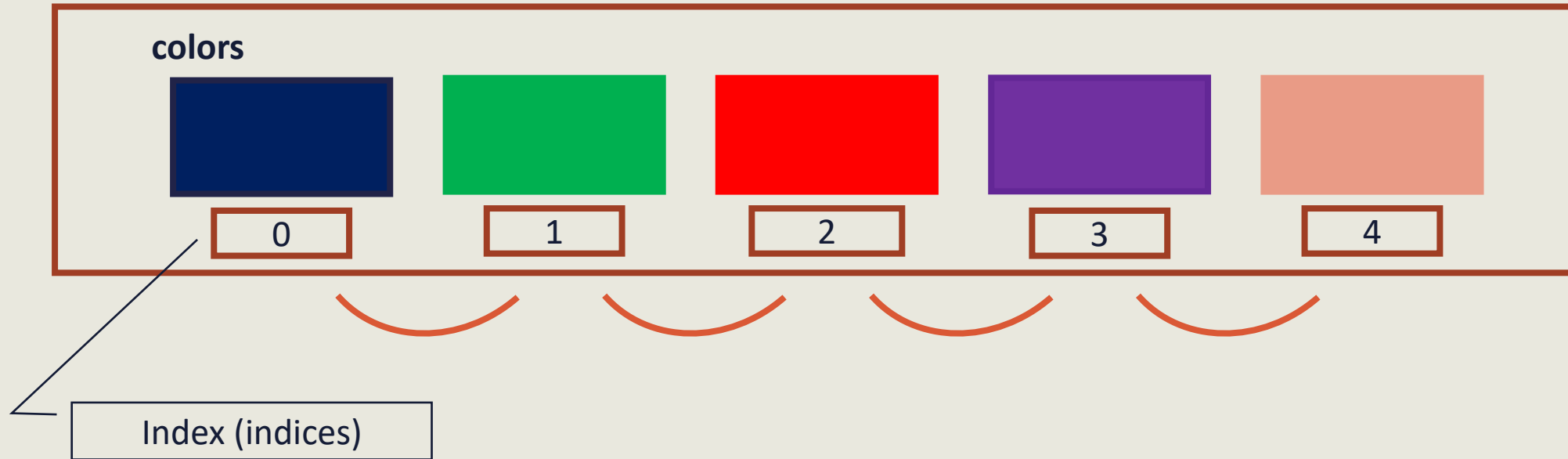


# AN ARRAY OF COLOURS



The array with the name of ***colors*** contains 5 elements numbered from 0 to 4

# AN ARRAY OF COLOURS



# DECLARING AND USING ARRAYS

**01**

```
const colors = ["blue", "green", "yellow", "red", "orange"];  
printOut = colors[2];
```

**02**

```
const colors = ["blue", "green", "yellow", "red", "orange"];  
printOut = colors[4];
```

**03**

```
const colors = ["blue", "green", "yellow", "red", "orange"];  
colors.push("purple");  
printOut = colors[5];
```

# ITERATING THROUGH THE ARRAY

01

```
const colors = ["blue", "green", "yellow", "red", "orange"];  
colors.push("purple");  
printOut = colors[5];
```

02

```
const colors = ["blue", "green", "yellow", "red", "orange"];  
colors.push("purple");  
for (let i=0; i <= 5; i++) {  
  printOut += colors[i] + "<br>";  
}
```

03

```
for (let i=0; i < colors.length; i++) {  
  printOut += colors[i] + "<br>";  
}
```

04

```
for (let i=0; i < colors.length; i++) {  
  printOut += colors[i] + " is my favorite!<br>";  
}
```



# ITERATING THROUGH THE ARRAY

**01**

```
const colors = ["blue", "green", "yellow", "red", "orange"];  
for (let x in colors) {  
  printOut += colors[x];  
}
```

**02**

```
for (let x in colors) {  
  printOut += colors[x] + ", ";  
}
```

**03**

```
for (let x in colors) {  
  printOut += colors[x] + "<br />";  
}
```

**04**

```
for (let color in colors) {  
  printOut += colors[color] + "<br />";  
}
```

# ITERATING THROUGH THE ARRAY

01

```
let total = 0;  
const cart = [ 100, 200, 400, 300 ];  
for (let item in cart) {  
  total+=cart[item];  
}  
printOut = "Total in cart " + total;
```

02

```
for (let item in cart) {  
  total+=cart[item];  
  printOut += "Item " + item + "<br />";  
}  
printOut += "Total in cart " + total;
```

03

```
for (let item in cart) {  
  total+=cart[item];  
  printOut += "Item " + item + " was " + cart[item] + "<br />";  
}  
printOut += "Total in cart " + total;
```

# ARRAY FACTS

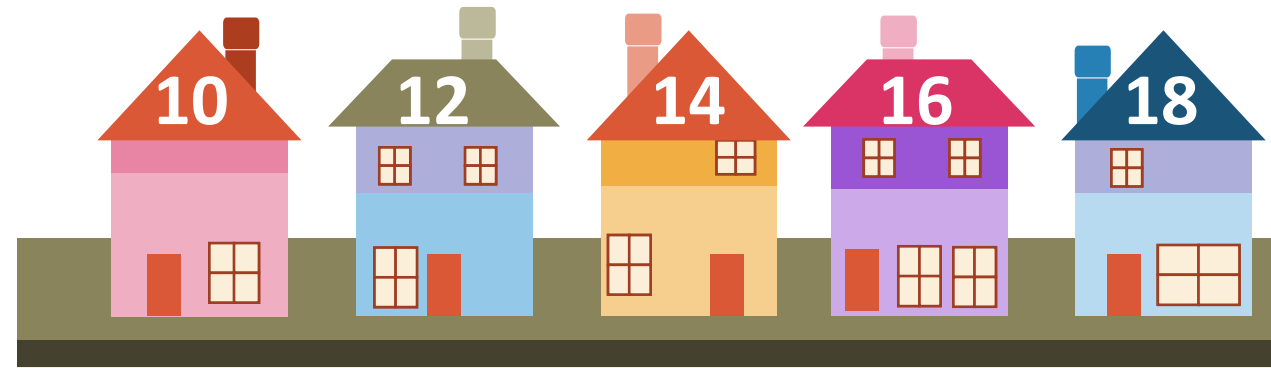
Know the following about arrays:

- Name
- Type of data stored
- Length (size)
- Identify elements
- Insert elements
- Remove elements
- *Other methods and functions*



# MORE ARRAY FACTS

- Delete from an array means using a function
- You can delete any element, but you must identify which one
- Insert and delete work similarly
- Once you insert or delete the length of the array changes
- It is possible to insert/delete multiple elements at once
- An error will occur if you try to access an element that does not exist





# More ARRAY Operations

01

```
const colors = ["blue", "green", "yellow", "red", "orange"];
colors.unshift("white");
for (let color in colors) {
  printOut += colors[color] + "<br />";
}
```

02

```
const colors = ["blue", "green", "yellow", "red", "orange"];
colors.splice(2,0,"white");//0 means do not delete anything
for (let color in colors) {
  printOut += colors[color] + "<br />";
}
```

03

```
const colors = [];
colors[0] = "blue";
colors[1] = "red";
colors[2] = "green";
```

# More ARRAY Operations

**01**

```
const colors = ["blue", "green", "yellow", "red", "orange"];  
printOut = colors.join(" ");
```

**02**

```
const colors = ["blue", "green", "yellow", "red", "orange"];  
printOut = colors.join(", ");
```

**03**

```
const colors1 = ["red", "orange", "yellow", "green"];  
const colors2 = ["blue", "indigo", "violet"];  
rainbow = colors1.concat(colors2);  
printOut = rainbow.join(", ");
```

# A SIMPLE ARRAY

Use arrays instead of many variables

```
color1 = "red"
```

```
color2 = "green"
```

```
color3 = "blue"
```

```
names = ["red", "green", "blue"]
```

# ACCESSING INDIVIDUAL ELEMENTS

For each element in the array I want to print its value, so Jane, then Bob and finally Tom

```
colors = [" red ", "green", "blue"]
```

```
for (let color in colors) {  
  printOut += colors[color] + "<br />";  
}
```

```
for (let color in colors) {  
  if(colors[color] == "blue")  
    printOut = "found the blue color";  
}
```

# FINDING INDIVIDUAL ELEMENTS

```
const colors = ["red", "orange", "yellow", "green", "blue", "indigo", "violet"];
let colorToFind = prompt("Which color are you looking for? ");
for (let i=0; i < colors.length; i++) {
    if(colorToFind == colors[i]){
        printOut = "We found your color";
    }
    else{
        printOut = "We could not find your color";
    }
}
```

```
colors = [" red ", "green", "blue"]
```

# FINDING INDIVIDUAL ELEMENTS

```
colors = [" red ", "green", "blue"]
```

```
const colors = ["red", "orange", "yellow", "green", "blue", "indigo", "violet"];
let colorToFind = prompt("Which color are you looking for? ");
for (let i=0; i < colors.length; i++) {
    if(colorToFind == colors[i]){
        printOut = "We found your color";
        break;
    }
    else{
        printOut = "We could not find your color";
    }
}
```

# FINDING INDIVIDUAL ELEMENTS

```
const colors = ["red", "orange", "yellow", "green", "blue", "violet"];
let colorToFind = prompt("Which color are you looking for? ");
for (let i=0; i <= colors.length; i++) {
    if(colorToFind == colors[i]){
        printOut = "We found your color";
        break;
    }
}
```

```
colors = [" red ", "green", "blue"]
```

# FINDING INDIVIDUAL ELEMENTS

```
const colors = ["red", "orange", "yellow", "green", "blue", "violet"];
let colorToFind = prompt("Which color are you looking for? ");
for (let i=0; i <= colors.length; i++) {
    if(colorToFind == colors[i]){
        printOut = "We found your color";
        break;
    }
}
if (printOut == "")
    printOut += "We could not find your color";
```

```
colors = [" red ", "green", "blue"]
```



# A SIMPLE ARRAY

## Sorting Arrays

```
const colors =  
    ["red", "orange", "yellow", "green", "blue", "indigo", "violet"];  
colors.sort();  
printOut = colors.join(", ");
```

# A SIMPLE ARRAY

## Sorting Arrays

```
const colors =  
    ["red", "orange", "yellow", "green", "blue", "indigo", "violet"];  
colors.reverse();  
printOut = colors.join(", ");
```

# A SIMPLE ARRAY

## Sorting Arrays

```
const colors =  
    ["red", "orange", "yellow", "green", "blue", "indigo", "violet"];  
const newColors = colors.slice(4);  
printOut = newColors.join(", ");
```

# A SIMPLE ARRAY

## Sorting Arrays

```
const colors =  
    ["red", "orange", "yellow", "green", "blue", "indigo", "violet"];  
printOut = colors.toString();
```